This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5 + 8x \leq \frac{37x - 3}{4} < -5 + 5x$$

The solution is $[-3.40, -1.00)$, which is option A.

A. $[a, b)$, where $a \in [-6.75, 1.5]$ and $b \in [-1.65, 0.15]$

$[-3.40, -1.00)$, which is the correct option.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-6, -0.75]$ and $b \in [-2.02, 0]$

$(-\infty, -3.40) \cup [-1.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $(a, b]$, where $a \in [-9, -0.75]$ and $b \in [-2.17, -0.45]$

$(-3.40, -1.00]$, which corresponds to flipping the inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-5.25, -1.5]$ and $b \in [-2.25, 0]$

$(-\infty, -3.40] \cup (-1.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-4}{3} - \frac{6}{9}x \leq \frac{-4}{2}x + \frac{7}{7}$$

The solution is $(-\infty, 1.75]$, which is option C.

A. $(-\infty, a]$, where $a \in [-6, 0.75]$

$(-\infty, -1.75]$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [0.75, 4.5]$

$[1.75, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $(-\infty, a]$, where $a \in [0.75, 4.5]$

* $(-\infty, 1.75]$, which is the correct option.

D. $[a, \infty)$, where $a \in [-2.25, 0.75]$

$[-1.75, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$5x + 9 < 9x - 8$$

The solution is $(4.25, \infty)$, which is option D.

A. $(-\infty, a)$, where $a \in [3.25, 8.25]$

$(-\infty, 4.25)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

B. (a, ∞), where $a \in [-4.25, -2.25]$

$(-4.25, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [-4.25, 1.75]$

$(-\infty, -4.25)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. (a, ∞), where $a \in [-1.75, 5.25]$

* $(4.25, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3x - 6 \geq 7x + 3$$

The solution is $(-\infty, -2.25]$, which is option A.

A. $(-\infty, a]$, where $a \in [-2.6, -0.1]$

* $(-\infty, -2.25]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [0.2, 4.2]$

$(-\infty, 2.25]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [1.25, 8.25]$

$[2.25, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. $[a, \infty)$, where $a \in [-4.25, 0.75]$

$[-2.25, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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5. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No less than 4 units from the number 7.

The solution is $(-\infty, 3] \cup [11, \infty)$, which is option A.

A. $(-\infty, 3] \cup [11, \infty)$

This describes the values no less than 4 from 7

B. $[3, 11]$

This describes the values no more than 4 from 7

C. $(3, 11)$

This describes the values less than 4 from 7

D. $(-\infty, 3) \cup (11, \infty)$

This describes the values more than 4 from 7

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 4x < \frac{20x + 8}{4} \leq 8 + 4x$$

The solution is $(-1.00, 6.00]$, which is option B.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-3, 0.75]$ and $b \in [1.5, 9]$

$(-\infty, -1.00] \cup (6.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $(a, b]$, where $a \in [-2.55, -0.22]$ and $b \in [5.25, 8.25]$

* $(-1.00, 6.00]$, which is the correct option.

C. $[a, b)$, where $a \in [-4.5, -0.75]$ and $b \in [4.5, 11.25]$

$[-1.00, 6.00)$, which corresponds to flipping the inequality.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-2.17, 0.3]$ and $b \in [2.25, 7.5]$

$(-\infty, -1.00) \cup [6.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3 + 7x > 9x \text{ or } 4 + 5x < 6x$$

The solution is $(-\infty, -1.5)$ or $(4.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.75, -0.75]$ and $b \in [3.23, 4.42]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.27, -2.32]$ and $b \in [1.2, 1.65]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-7.5, -2.25]$ and $b \in [0.07, 2.7]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3.97, 1.12]$ and $b \in [2.32, 4.35]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5 + 4x > 7x \text{ or } 7 + 7x < 9x$$

The solution is $(-\infty, -1.667)$ or $(3.5, \infty)$, which is option C.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.71, -3.04]$ and $b \in [0.97, 3.38]$

Corresponds to inverting the inequality and negating the solution.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.5, -1.72]$ and $b \in [-1.35, 3.23]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.21, -0.17]$ and $b \in [1.8, 5.1]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-1.8, -0.82]$ and $b \in [3.3, 3.67]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-9}{4} - \frac{6}{7}x < \frac{8}{8}x + \frac{7}{5}$$

The solution is $(-1.965, \infty)$, which is option D.

A. (a, ∞), where $a \in [0, 4.5]$

$(1.965, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [0, 4.5]$

$(-\infty, 1.965)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. $(-\infty, a)$, where $a \in [-2.25, 0]$

$(-\infty, -1.965)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. (a, ∞), where $a \in [-6.75, -0.75]$

* $(-1.965, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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10. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No more than 10 units from the number -7.

The solution is $[-17, 3]$, which is option B.

A. $(-17, 3)$

This describes the values less than 10 from -7

B. $[-17, 3]$

This describes the values no more than 10 from -7

C. $(-\infty, -17) \cup (3, \infty)$

This describes the values more than 10 from -7

D. $(-\infty, -17] \cup [3, \infty)$

This describes the values no less than 10 from -7

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.
